

REMARKS

The Office Action dated October 7, 2003, has been received and reviewed.

Claims 1-24 are currently pending and under consideration in the above-referenced application. Each of claims 1-24 stands rejected.

Claims 1-14 and 16-24 have been amended to replace each occurrence of the term "said" with "the." As these are equivalent terms, these amendments do not alter the scopes of any of claims 1-14 or 16-24.

Independent claim 13 has also been amended to recite that the at least one shallow trench isolation structure thereof contacts an active surface of the semiconductor substrate thereof.

Claim 15 has been canceled without prejudice or disclaimer.

Reconsideration of the above-referenced application is respectfully requested.

Information Disclosure Statements

Please note that Information Disclosure Statements were filed in the above-referenced application on August 30, 2001, and November 15, 2002, but that the undersigned attorney has not yet received any indication that the references cited in these Information Disclosure Statements have been considered in the above-referenced application. It is respectfully requested that the references cited in the Information Disclosure Statements of August 30, 2001, and November 15, 2002, be considered and made of record in the above-referenced application and that initialed copies of the Forms PTO-1449 that accompanied the Information Disclosure Statements be returned to the undersigned attorney as evidence of such consideration.

Preliminary Amendment

Also, please note that a Preliminary Amendment was filed in the above-referenced application on January 31, 2002, but that the undersigned attorney has not yet received any acknowledgement that the Preliminary Amendment has been entered into the Office file for the above-referenced application. If, for some reason, the Preliminary Amendment has not yet been entered into the Office file, the undersigned attorney would be happy to provide the Office with a true copy thereof.

35 U.S.C. § 101 Double Patenting Rejection

Claims 5, 7-12, 14, 16, and 18-24 stand rejected under 35 U.S.C. § 101 for purportedly reciting the same invention as that recited in claims 5-12 of U.S. Patent 6,322,634 (hereinafter “the ‘634 Patent”).

35 U.S.C. § 101 provides in relevant part: “Whoever invents or discovers any new and useful process . . . may obtain *a* patent therefor . . .” (emphasis added). In explaining the basis on which a double patenting rejection under 35 U.S.C. § 101 should be premised, M.P.E.P. § 804(II)(A) provides:

In determining whether a statutory basis for a double patenting rejection exists, the question to be asked is: Is the same invention being claimed twice?

. . . Is there an embodiment of the invention that falls within the scope of one claim, but not the other? If there is such an embodiment, then identical subject matter is not defined by both claims and statutory double patenting would not exist.

It is respectfully submitted that, while claim 5 of the above-referenced application recites a precursor to a semiconductor device structure with many of the same elements of the intermediate semiconductor device structure of claim 5 of the ‘634 Patent, the buffer film layer of claim 5 of the above-referenced application need not comprise “a substantially oxidation resistant materials [sic]” as required by claim 5 of the ‘634 Patent. Therefore, it is respectfully submitted that claim 5 of the above-referenced application does not recite identical subject matter to that recited in claim 5 of the ‘634 Patent. Accordingly, under 35 U.S.C. § 101, claim 5 of the above-referenced application is allowable over claim 5 of the ‘634 Patent.

Independent claim 7 of the above-referenced application likewise appears to have been rejected for reciting the same subject matter as that to which claim 5 of the ‘634 Patent is drawn. Like claim 5 of the above-referenced application, however, independent claim 7 lacks the requirement that the buffer film layer thereof comprise “a substantially oxidation resistant materials [sic].” As independent claim 7 lacks a limitation that is present in claim 5 of the ‘634 Patent, independent claim 7 does not recite subject matter which is identical to that recited in

claim 5 of the '634 Patent and, thus, is, under 35 U.S.C. § 101, allowable over claim 5 of the '634 Patent.

Claims 8-12 are each allowable, among other reasons, for depending either directly or indirectly from claim 7, which is allowable.

Claims 14 and 16 of the above-referenced application have apparently been rejected for reciting the same subject matter as that recited in claims 8 and 9, respectively, of the '634 Patent. Claims 14 and 16 differ in scope from claims 8 and 9, however, because claims 14 and 15 lacks the requirement that a trench be "formed in an active surface" of a semiconductor substrate, instead reciting (in claim 13, from which claims 14 and 16 both depend) that the trench is merely formed in the semiconductor substrate. In view of this difference, it is respectfully submitted that claims 14 and 16 of the above-referenced application differ in scope from claims 8 and 9, respectively, of the '634 Patent and, thus, that, under 35 U.S.C. § 101, claims 14 and 16 are allowable over claims 8 and 9, respectively, of the '634 Patent.

Independent claim 18 of the above-referenced application has apparently been rejected for reciting the same subject matter as that recited in claim 5 of the '634 Patent. Like claim 5 of the above-referenced application, however, independent claim 18 lacks the requirement of claim 5 of the '634 Patent of a buffer film layer that comprises "a substantially oxidation resistant materials [sic]." Therefore, it is respectfully submitted that independent claim 18 does not recite identical subject matter to that recited in claim 5 of the '634 Patent. Accordingly, under 35 U.S.C. § 101, independent claim 18 of the above-referenced application is allowable over claim 5 of the '634 Patent.

Each of claims 19-24 is allowable, among other reasons, for depending either directly or indirectly from claim 18, which is allowable.

For these reasons, it is respectfully requested that the 35 U.S.C. § 101 double patenting rejections of claims 5, 7-12, 14, 16, and 18-24 be withdrawn.

Obviousness-Type Double Patenting Rejection

Claims 1-4, 6, 13, 15, and 17 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 5-12 of U.S. Patent 6,322,634. A terminal disclaimer and the appropriate fee are being filed herewith, in compliance with 37 C.F.R. § 1.321(b) and (c), to obviate the obviousness-type double patenting rejection, thereby expediting prosecution of the above-referenced application and avoiding further expense and time delay. The filing of a terminal disclaimer in the above-referenced application should not be construed as acquiescence of the obviousness-type double patenting rejection.

Provisional Claim Objection Under 37 C.F.R. § 1.75

Claim 20 has been provisionally objected to under 37 C.F.R. § 1.75 for being a substantial duplicate of independent claim 7.

It is respectfully submitted that claim 20 is not a substantial duplicate of independent claim 7. For example, claim 20 depends from claim 18, which recites that the shallow trench isolation structure thereof “contact[s] an area of [an] active surface” of a semiconductor substrate, while independent claim 7 includes no such requirement.

Accordingly, withdrawal of the provisional objection to claim 20 is respectfully requested.

Rejections Under 35 U.S.C. § 102(b)

Claims 1-4, 6, 13, 15, and 17 stand rejected under 35 U.S.C. § 102(b).

Mandelman

Claims 1-4, 6, 13, 15, and 17 stand rejected under 35 U.S.C. § 102(b) for reciting subject matter which is purportedly anticipated by that described in U.S. Patent 5,521,422 to Mandelman et al. (hereinafter “Mandelman”).

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single reference which qualifies as prior art under

35 U.S.C. § 102. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Mandelman describes (at col. 5, lines 3-23) and illustrates (in FIG. 4c) a precursor to a semiconductor device structure that includes a semiconductor substrate 10 with trenches formed therein. The trenches and areas of the active surface of the semiconductor substrate 10 that are adjacent to the trenches are lined with a thermal oxide 34. Shallow trench isolation (STI) structures 18a fill the remaining space within the trenches, and extend over the areas of the active surface of the semiconductor substrate that are located adjacent to the trenches.

The precursor to which independent claim 1 is drawn includes many of the elements described in Mandelman, but lacks an intervening thermal oxide between the STI structures and the surfaces of the trenches and active surface of the semiconductor substrate. Instead, independent claim 1 recites “at least one shallow trench isolation structure” that contacts “an active surface of [a] semiconductor substrate adjacent . . . at least one trench.”

As Mandelman neither expressly nor inherently describes that the STI structures thereof may contact an active surface of a semiconductor substrate, Mandelman does not anticipate each and every element of independent claim 1, as is required to maintain a rejection under 35 U.S.C. § 102(b). Therefore, under 35 U.S.C. § 102(b), independent claim 1 recites subject matter which is allowable over that described in Mandelman.

Each of claims 2-4 and 6 is allowable, among other reasons, for depending either directly or indirectly from claim 1, which is allowable.

Independent claim 13, as amended and presented herein, recites an intermediate semiconductor device structure which includes a semiconductor substrate with at least one trench formed therein and at least one shallow trench isolation structure within the at least one trench. The at least one shallow trench isolation structure of amended independent claim 13 extends laterally over and contacts only a portion of an active surface of the semiconductor substrate.

Mandelman lacks any express or inherent description that the STI structures of the intermediate semiconductor device structure described therein may contact a portion of an active

surface of that semiconductor substrate of the intermediate semiconductor device structure. Rather, the description of Mandelman is limited to an intermediate semiconductor device structure with an intervening thermal oxide layer between the STI structures and the surfaces (including the active surface and trench surfaces) of the semiconductor substrate.

As Mandelman does not anticipate each and every element of amended independent claim 13, it is respectfully submitted that, under 35 U.S.C. § 102(b), amended independent claim 13 recites subject matter which is allowable over that described in Mandelman.

Claim 15 has been canceled without prejudice or disclaimer, rendering the rejection thereof moot.

Claim 17 is allowable, among other reasons, for depending from claim 13, which is allowable.

Morita et al.

Claims 1-4, 6, 13, 15, and 17 stand rejected under 35 U.S.C. § 102(b) for reciting subject matter which is assertedly anticipated by the disclosure of U.S. Patent 5,506,168 to Morita et al. (hereinafter "Morita").

FIG. 72 of Morita shows an intermediate semiconductor device structure that includes a semiconductor substrate 1 with at least one trench 2 formed therein, silicon oxide films 11 and 36 lining the active surface of the semiconductor substrate 1 and the surfaces of the trench 2, respectively, and a silicon nitrogen film 37 filling the at least one trench. *See also*, col. 13, lines 19-26.

Again, independent claim 1 of the above-referenced application recites a precursor to a semiconductor device structure. The precursor includes, among other things, a semiconductor substrate with at least one trench formed therein and at least one shallow trench isolation structure. A portion of the at least one shallow trench isolation structure extends laterally over and contacts an area of an active surface of the semiconductor substrate located adjacent to the at least one trench.

In contrast, Morita does not expressly or inherently describe that the silicon nitrogen film 37 thereof contacts an active surface of the underlying semiconductor substrate 1. Instead, a

silicon oxide film 11 is located between the silicon nitrogen film 37 and the active surface of the substrate 1.

Therefore, Morita does not anticipate each and every element of independent claim 1. Accordingly, under 35 U.S.C. § 102(b), independent claim 1 is drawn to subject matter which is allowable over that disclosed in Morita.

Claims 2-4 and 6 are each allowable, among other reasons, for depending either directly or indirectly from claim 1, which is allowable.

Amended independent claim 13 also recites subject matter which is allowable over that described in Morita because Morita includes no express or inherent description that the silicon nitrogen layer 37 thereof contacts the active surface of the semiconductor substrate 1 thereof.

The rejection of claim 15 is moot, as claim 15 has been canceled without prejudice or disclaimer.

Claim 17 is allowable, among other reasons, for depending from claim 13, which is allowable.

In view of the foregoing, it is respectfully requested that the 35 U.S.C. § 102(b) rejections of claims 1-4, 6, 13, 15, and 17 be withdrawn.

35 U.S.C. § 103(a) Obviousness Rejections

Claims 5, 7-12, 14, 16, and 18-24 stand rejected under 35 U.S.C. § 103(a) for reciting subject matter which is purportedly unpatentable over that taught in Mandelman, in view of teachings from U.S. Patent 5,834,358 to Pan et al. (hereinafter "Pan").

With respect to rejections under 35 U.S.C. § 103(a) that are based upon references which qualify as prior art under 35 U.S.C. § 102(e), 35 U.S.C. § 103(c) provides:

Subject matter developed by another person, which qualifies as prior art only under one or more of subsections (e), (f), and (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

M.P.E.P. § 706.02(1)(3) explains that the evidentiary burden of the requirement that the subject matter and claimed invention be, “at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person” is met merely by a statement to that effect:

Applications and patents will be considered to be owned by, or subject to an obligation of assignment to, the same person, at the time the invention was made, if the applicant(s) or an attorney or agent of record makes a statement to the effect that the application and the reference were, at the time the invention was made, owned by, or subject to an obligation of assignment to, the same person(s) or organization(s).

See also M.P.E.P. § 706.02(1)(2)

Only in the rare instance that the examiner “may have independent evidence that raises a material doubt as to the accuracy of applicant’s representation of either (1) the common ownership or, or (2) the existence of an obligation to commonly assign, the application being examined and the applied U.S. patent or U.S. patent application publication reference” may the examiner “require objective evidence of common ownership of, or the existence of an obligation to assign, the application being examined application and the applied reference as of the date of invention of the application being examined.” M.P.E.P. § 706.02(1)(2).

M.P.E.P. § 706.02(1)(1) indicates that 35 U.S.C. 103(c) applies to all applications which have filing or priority dates of November 29, 1999, or later:

This change to 35 U.S.C. 103(c) applies to all utility, design and plant patent applications filed on or after November 29, 1999, including continuing applications filed under 37 CFR 1.53(b), continued prosecution applications filed under 37 CFR 1.53(d), and reissues.

The Office has already indicated, at page 3 of the Office Action of October 7, 2003, that Pan “constitutes prior art only under 35 U.S.C. 102(e).” This is because priority for the above-referenced application is based upon U.S. Application Serial No. 08/789,470, filed on January 27, 1997, which predates the November 10, 1998, issue date of Pan.

At the time the invention disclosed in the above-referenced application and in U.S. Application Serial No. 08/789,470 was made, it was owned by or subject to an obligation of assignment to Micron Technology, Inc., as evidenced by the assignment recorded at Reel No. 8435, Frame No. 0673, and by the corrective assignment recorded at Reel No. 8618, Frame No. 0703. Micron Technology, Inc. is the same party to which Pan had already been assigned, as indicated on the cover sheet of Pan.

Accordingly, Pan may not be relied upon in a rejection of any of the claims of the above-referenced application under 35 U.S.C. § 103(a).

Therefore, withdrawal of the 35 U.S.C. § 103(a) rejections of claims 5, 7-12, 14, 16, and 18-24 is respectfully requested.

CONCLUSION

It is respectfully submitted that each of claims 1-14 and 16-24 is allowable. An early notice of the allowability of each of these claims is respectfully solicited, as is an indication that the above-referenced application has been passed for issuance. If any issues preventing allowance of the above-referenced application remain which might be resolved by way of a telephone conference, the Office is kindly invited to contact the undersigned attorney.

Respectfully submitted,



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Date: January 7, 2004

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